own time; but the groups first done could be published, without waiting for the others. The publication of the lists would be rather expensive, and would have to be undertaken by some institution. Whether the work itself could be done by volunteers, I do not know; but if any money could be obtained in payment for it, it would probably be easier to find workers.

2. At present new species of animals are described in all sorts of publications, in consequence of which it often becomes expensive or difficult to obtain the descriptions relating to any one group. It might be a very good plan if all descriptions of new species and varieties of North American animals were published (or republished) in a single series, on leaflets somewhat like those issued by the Biological Society of Washington. It might be so arranged that each leaflet should include only a single species or variety, or perhaps only those of a single genus, and each might be sold at a stated price. One could then subscribe for all the new descriptions pertaining to a certain genus, family or order, and receive them immediately upon publication. They could be bound up, when numerous enough, in any way that proved convenient; *e. g.*, all the new animals from Colorado, or all the new mammals from North America. The descriptions should, of course, be published promptly, and strictly in the order of their receipt at the editorial office. All descriptions of reputable authors should be accepted, but it would be appropriate to make certain rules, applicable to all; thus it might be required that the descriptions should be reasonably complete, or not conspicuously incomplete; that the exact locality and collector's name should be given, if ascertainable; and that comparison should be made with allied species. The same plan would be equally applicable to plants, of course. A special series of leaflets, issued with the others, might be devoted to the proposal of synonymy, or of new combinations. How much financial support such a plan would require I do not know; perhaps it would pay for itself, or nearly. It would probably not be necessary to take any special steps to persuade authors to send their new descriptions for publication in the leaflets; the majority would doubtless soon do so as a matter of course, while those who did otherwise would find their descriptions reprinted in the regular series.

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Special Articles.

A Card Index Stock List for Use in University Departments of Organic Chemistry.

One of the administrative difficulties confronting the head of a university department of organic chemistry is the proper listing of the great variety of chemicals carried in stock, and constantly accumulating year by year as the result of the various investigations conducted in the laboratory. The troubles of the organic chemist in this respect are much greater than those of his inorganic colleague, for he must carry in stock not only about all the chemicals required by the inorganic chemist, but his own innumerable organic chemicals as well. In the larger universities, this accumulation of stock in the departments of organic chemistry amounts to many thousand lots, generally distributed in various rooms—the general stock rooms and closets, the main laboratory, the research rooms, the rooms of the officers of the department, the chemical museum, and elsewhere; in all kinds of containers, large and small, boxes, crocks, bottles, specimen tubes, and the like. To classify and list this mass of scattered material in such a way that an instructor can tell in a few moments whether a certain chemical is available in the department, and if so, in what amount and quality, and, further, to keep such a list constantly up to date, in spite of daily removal of stock and addition of new material, is not a simple task, as I think most of my colleagues will admit. And yet, without such a list more or less confusion is likely to result, and much valuable time will be wasted in pawing over a lot of bottles or specimen tubes in a vain search for a compound which is not in stock at all or can not be found, or, in other cases, for substances which, when found, prove to be too impure or too small in amount to be of any use. In this country, the failure to keep

accurate track of stock available is more serious in the case of organic compounds than of inorganic, for the latter can usually be secured here of satisfactory quality, but, with the exception of the very commonest, practically all fine organic chemicals must be imported from Germany. As it takes about two months for such importations, a serious delay may thus be caused in the prosecution of a research, the only escape from which is for the investigator to turn in and make the substance himself.

right) also. Thus '406, 16, 1, 10' would mean—room 406, shelf 16, row 1, bottle No. 10. It is not necessary often to elaborate quite so much as this—for increased elaboration means diminished freedom of arrangement on the shelves—but we have found it helpful in the case of deep shelves in dark corners, and it then becomes necessary to supplement the general index by a special shelf list, to prevent and correct any disarrangement of stock on the shelves.

The index is a card catalogue, composed of

Name, *p*-Amino Benzonitrile, II, 1273.

Formula, $C_7H_6N_2 = C_6H_4\begin{matrix}CN\ (1)\\NH_2\ (4)\end{matrix}$ =  M. P., 86°.

B. P.

Amount.	Maker.	M. P.-B. P.	Location.	Cost.	Remarks.	Date.
10 gm.	L. Kohnstamm.	86°	Museum.		Reduction of nitro nitrile.	1902
0.7 "	"	"	408 N.		Engler's method; Zn + HCl.	"
1.0 "	"	"	"		$SnCl_2$ + HCl.	"
0.5 "	"	85.6	"		Fricke's method; Sn + HA.	"
0.2 "	Ferrero.	85–85.5	"		*p*-uramino benzoic acid + P_2O_5	"
50 "	Williamson.	86	405		Reduction of nitro; c. p.	1903

We have not found it necessary to index our inorganic stock, for this can be satisfactorily classified by keeping all the compounds of the same element together, and arranging the elements alphabetically on the shelves of the stock room. We have found it necessary, however, to index our organic stock, with the exception of the reagents on the laboratory shelves.

That an alphabetical classification of organic substances is not very satisfactory will, I think, be readily admitted by all organic chemists, particularly by those who have had occasion to search for compounds in Watts's Dictionary. No doubt every method of classification has its shortcomings and inconsistencies, but for purposes of indexing we have found the 'Beilstein' classification most satisfactory, for the reason that when in doubt we can always refer to this standard work, or to Richter's 'Lexikon,' which latter constitutes a complete general index to Beilstein. In order to record location of stock, our rooms are all numbered, and when necessary the shelves (from top to bottom), rows (from back to front) and individual bottles (from left to

5″ x 8″ cards. The Macey cards are by far the most convenient, as their side locking system permits the removal of any card, by a half turn of the locking rod, as rapidly as though the cards were not locked in at all. A sample card is shown herewith. These cards are arranged in drawers in the 'Beilstein' order, colored guide cards indicating the divisions of the classification. The numbers (II., 1273) in the upper right-hand corner indicate the volume and page of Beilstein's 'Handbuch' (third edition) where the compound will be found described in detail. This has the further advantage that when one does not remember off-hand in just which group a certain compound is classified, all that is necessary is to get the volume and page reference from Beilstein and it can then be found very quickly in the index. In other words, the paging (if it may so be termed) of the index is identical with that of Beilstein. The melting-points (M. P.) and boiling-points (B. P.) provided for in the upper right-hand corner are those recorded in the literature, while those in the column near the middle of the card represent the actual melting-points or

boiling-points of the various samples listed; a comparison of the two will, therefore, indicate the probable purity of the different samples. It is obvious that such a card properly filled out will give the instructor at a glance all the information desired concerning his stock.

I think that I hear the reader saying to himself, 'All very pretty! but it must take an immense amount of time to get up such a list, and it would be perfectly hopeless to attempt to keep it up to date!' It is quite true that it does take some time to prepare such a list, particularly where the mass of material is great, but the time thus lost is very quickly made up by the time saved in the use of the index, and when once done it does not have to be done over again. I assume that every laboratory finds it desirable to take a complete account of stock at least once a year. As to the other objection—keeping such a list up to date, our method is as follows: Two sets of printed blanks are used, about 3″ x 5″, one printed on blue paper, the other on white. One is for stock removed, the other for new stock. On the blanks headed 'Removed' are the following items—substance, amount, maker, location, date, for; on the 'New Stock' blanks—substance, amount, maker, cost, location, date. Whenever any chemical is removed from stock for use in a research, to replenish a reagent bottle, or for whatever purpose, one of these 'Removed' blanks is filled out and put on file, and once a month or so these blanks are checked up and the index corrected accordingly. After correcting the index, the blanks are not destroyed, but are kept on permanent file, and at the close of the year an examination of the total blanks on file will show exactly how much and where the stock is most in need of replenishing, thereby furnishing the necessary information for the preparation of the annual import order. The 'New Stock' blanks should also be placed on permanent file after having been entered in the index. It will be found more convenient, in both cases, to use a separate blank for each separate bottle.

Such a general stock list is not only a perpetual inventory, but it may also do duty as a chemical museum catalogue, and be useful in other directions also. For example, it will show instantly any change in the market price of the chemicals listed, and perhaps thus lead occasionally to the correction of unintentional overcharges on the part of dealers. When once made, it requires only occasional attention, and the addition of new cards for new substances. Wherever possible, as in the chemical museum and general stock rooms, the stock should be arranged in the same order as in the index.

As the above method has appeared to interest so many of our brother chemists both here and abroad, I have taken this opportunity of making it available to all, in the hope that others may find in it something useful or suggestive. It has been in use in the department of organic chemistry of Columbia University for several years, and has been of very great assistance to us in our work.

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March 30, 1905.

A QUANTITATIVE CIRCULATION SCHEME.

THE artificial scheme (Fig. 1) to illustrate the mechanics of the circulation in the highest vertebrates consists of a pump, a system of elastic tubes and a peripheral resistance. The inlet and the outlet tubes of the pump are furnished with valves that permit a flow in one direction only. The peripheral resistance is the friction which the liquid undergoes in flowing through the minute channels of a piece of bamboo. To this must be added the slighter resistance due to friction in the rubber and glass tubes.

In this system the pump represents the left ventricle; the valves in the inlet and outlet tubes, the mitral and aortic valves, respectively; the resistance of the channels in the bamboo, the resistance of the small arteries and capillaries. The tubes between the pump and the resistance are the arteries; those on the distal side of the resistance are the veins. The side branch substitutes a wide channel for the narrow ones, and thus is equivalent to a dilatation of the vessels.